X-Plane 11 Fokker Dr.1

Pilot's Operating Manual

Version 0.3d

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Jemma Studios

Disclaimer

Information contained in this document has been collected from multiple resources, none of which has been checked for accuracy in any meaningful way. There is also a bunch of stuff I simply made up. Don't expect much, and certainly don't use it for anything other than entertainment within the X-Plane flight simulator, because if you use it for real life flying, well, frankly, you deserve to die. (Note: the author does not endorse dying)

Distribution

Background: The Fokker Dr.1

Made famous by Manfred Von Richthoffen (The Red Baron), the Fokker Dr.1 was developed by Fokker-Flugzeugwerke in 1917 in answer to the British Sopwith Camel. It was first tested in the late summer of 1917 and Richthoffen first flew it in combat in the fall of 1917. It was agile, climbed unlike anything else in the air, and proved deadly to British aviators.

The aircraft is fun to fly and hell to taxi. This aircraft honors the original feel of the WW1 fighter in that it has no brakes, a solid wood tail skid, and horrible visibility on the ground. On the other hand, she leaps into the air and is snappy to fly. Landing is also very challenging with no brakes so be sure to be near stall speed when you touch down unless you like to roll off the end of runways.

It is virtually required that you only operate this aircraft on a grass field, and only into the wind on landings. The allowable crosswind component is <10kts.

Fokker Dr.1 Specifications

Engine:

	Model:	Oberursel Ur.11 9-cylinder air-cooled rotary piston engine
	Power:	82 kW (110 hp)
	Propeller:	2-blade fixed-pitch wooden propeller

Fuel:

	Capacity:	72 liters (18 gallons)
	Fuel Consumption:	46 liters/hour (12 gallons/hour)

Armament:

	Weapons:	Two – Spandau LMG 08/15 machine guns
	Ammunition:	1000 rounds belt fed 7.92x57 Mauser (500 rounds each gun)
	Rate of Fire:	450 rounds/minute (each gun)

Performance:

	Max speed:	fast enough to uncurl a heavily waxed handlebar mustache
	Stall speed:	pretty slow

Installation

IF YOU HAVE A VERSION OLDER THAN 0.2 PLEASE COMPLETELY DELETE THE OLD AIRCRAFT FIRST!

Drop the Jemma Studios folder into your X-Plane 11/Aircraft folder. The Dr1 will appear in your "Experimental" section of your Flight Configuration screen.

I recommend creating a new profile and mapping the following commands to your Joystick or Keyboard Assignments:

Flight Controls-Weapons-Fire guns	Dr1-guns-Fire left machine gun
Dr1-command-Actuates the Schnirpsknopf (blip switch)	Dr1-guns-Fire right machine gun

You may also map the following commands (though honestly it's easier to screen click these)

Dr1-guns-Toggle the left cocking assist lever	Dr1-guns-Moves the left safety lever up
Dr1-guns-Toggle the right cocking assist lever	Dr1-guns-Moves the left safety lever down

Dr1-guns-Cycles left bolt lever

Dr1-guns-Moves the right safety lever up

Dr1-guns-Cycles right bolt lever

Dr1-guns-Moves the right safety lever down

Panel & Instruments

1. **Schparkmacher** (Magneto Switch)
2. **Schparkencranker** (Magneto)
3. **Firewasserswitchen**. (Fuel Switch)
4. **Benzinegamixer** (Mixture Lever)
5. **Firewassergozinter** (Throttle Lever)
6. **Schteeringschtick** (Yoke)
7. **Schnirpsknopf** (Schnirpsknopf). The blip button is used to control speed during taxi and landing. Holding it in cuts off the fuel supply which (obviously) slows the motor. Be sure to let go before the RPM's drop much below 200rpm to be sure it restarts. (As soon as the prop is slow enough to see.) If it doesn't refire, nose down to get the prop moving again or get someone to spin the prop again.
8. **Schpinanzeige** (Tachometer) Pretty sure this gauge reads in RPM.
9. **Ubergroundaheight** (Altimeter) in kilometers. (I can't use it this way either so I ignore it)
10. **Kollsmanknopf** (Kollsman Knob). No barometric pressure display on this aircraft. Adjust knob to get close to the field elevation. If you don't know the field elevation, ask someone nearby.
11. **Werzafügarja** (Compass). The red magnetic north arrow (it has an "N" on it) points to magnetic north. (Might be important if there is a quiz later)
12. **Werzafügarjazeiger** (Compass Setting Needle). Spin this to point at the heading you want to fly, then turn the aircraft so the North arrow is under the needle. (It really works)
13. **Öl Perkolator** (Oil Pulsator). Pulses approximately every 5 seconds. Keep an eye on the level, if it starts getting low, you better land before the oil runs out. (It takes about an hour and a half to go dry)
14. **Noisenmachers** (Machine gun triggers). Used to make lots of noise, if the guns are armed properly. (You can fire left or right guns by pressing near the bottom of the button, pressing near the top of either trigger will fire both weapons)

15. **Firewasseranzeige** (Fuel gauge). In liters. Divide by 4 for gallons. (Or just land before it gets close to zero)

16. **Kanoniergelever** (Arming assist lever) used to force the bolt action to advance the ammo belt as well as cock the weapon.

17. **Gunkocher** (Arming bolt) Used to manually operate the action.

18. **Zafetygelever** (Safety Lever) Moving this up takes the bolt out of battery so the weapon cannot fire.t
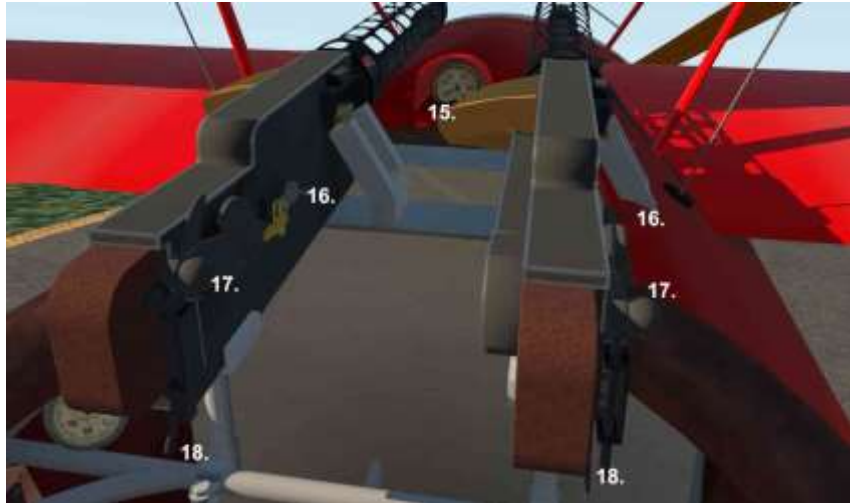
19. **Windmacher** (Propeller). You'll be grabbing the prop to get it going (follow the start up procedure) [Note: OpenGL users will have an unrealistic start button appear above the SCHPARKMAKER]

20. **Schtoppborden** (Wheel chocks). You can only place/remove the boards if the aircraft is still.

21. **Kontrolviggler** (Control Surface Wiggler – Ailerons). Verify ailerons move freely before flight.
22. **Kontrolviggler** (Control Surface Wiggler – Elevators). Verify elevators move freely before flight.
23. **Kontrolviggler** (Control Surface Wiggler – Rudder). Verify rudder moves freely before flight.

Note: An anemometer was delivered with the aircraft, but removed by most pilots. It was mounted on the lateral wing struts to keep it out of the propwash. It's more fun to fly, listening to the wind or watching Albert's mustache for speed clues, so it's not available at this time.

Pre Startup Procedure

Walk around procedure. Typically starting on pilots side at the front and working around the aircraft counter clockwise (clockwise if you are in the southern hemisphere[1])

[ ] Ensure wheels are chocked with the SCHTOPPBORDEN (20)
[ ] Inspect left main tire for dry rot, lose hub bolt, or unusual wear
[ ] Inspect motor for bird's nests, sleeping cats, or dead squirrels
[ ] Check linkages and ensure left aileron is moving freely with KONTROLVIGGLER (21)
[ ] Inspect left fuselage for wear and/or damage
[ ] Check linkages and ensure elevators are moving freely with KONTROLVIGGLER (22)
[ ] Check linkages and ensure rudder is moving freely with KONTROLVIGGLER (23)
[ ] Inspect right fuselage for wear and/or damage
[ ] Check linkages and ensure right aileron is moving freely with KONTROLVIGGLER (21)
[ ] Check right main tire for dry rot, lose hub bolt, or unusual underwear

Start Up Procedure

Word of advice. This aircraft has no brakes and high idle, even on grass it may start moving as soon as the engine starts so be sure the wheel chocks are in place.

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[1] I figure if toilets flush backwards there, you better walk the aircraft backward, just in case.

[ ] Check control surfaces operate freely
[ ] Place SCHTOPPBORDEN (20)
[ ] Set KOLLSMANKNOPF (10) to field elevation
[ ] Set BENZINEGAMIXER (4) to FULL (pull handle back)
[ ] Set FIREWASSERGOZINTER (5) to IDLE
[ ] Set SCHPARKMACHER (1) to position 1
[ ] Set FIREWASSERSWITCHEN (2) to ON (vertical position)
[ ] Crank SCHPARKENCRANKER (2) until you hear it start to spark (about 10 times)
[ ] Check SCHNIRPSKNOPF (7) is not depressed
[ ] Switch to exterior view and hold the WINDMACHER (19) to start [NOTE: The WINDMACHER is finicky and won't necessarily start on the first (, second, or third) pull.

Taxi Procedure

[ ] Say a prayer
[ ] Switch to exterior view and remove SCHTOPPBORDEN (20)
[ ] Use only enough FIREWASSERGOZINTER (5) to get it moving, otherwise IDLE
[ ] On long taxi's use the SCHNIRPSKNOPF (7) intermittently to cut fuel, but release it to allow fuel to flow again before the prop stops

Takeoff Procedure

[ ] Slight backpressure on SCHTEERING SCHTICHEN (6)
[ ] Set FIREWASSERGOZINTER (5) to FULL
[ ] When tail starts to lift, release SCHTEERING SCHTICHEN backpressure
[ ] Yell, "Wow, that thing took off in no time!"

Cruise/Climb Procedure

[ ] Don't hit anything
[ ] Adjust BENZINEGAMIXER (3) to max RPM
[ ] Monitor the ÖL PERKOLATOR (13). (If the oil pulses start to get low, find a place to land)

Descent Procedure

[ ] Push forward on the SCHTEERING SCHTICHEN (6)

Landing Procedure

Word of advice. The engine idles at 700rpm which is makes the aircraft fly way too fast to land in a reasonable distance. You'll want the aircraft as slow as possible, so keep your glideslope shallow. You'll also find that this is where the SCHNIRPSKNOPF comes in.

[ ] Set BENZINEGAMIXER (4) to FULL
[ ] Set FIREWASSERGOZINTER (5) to IDLE
[ ] Over the threshold cut fuel with the SCHNIRPSKNOPF (7).
[ ] After touch down hold neutral SCHTEERING SCHTICHEN (6) until tail skid touches down
[ ] Apply SCHTEERING SCHTICHEN (6) backpressure with continued added, gentle pressure to dig the tail skid in (which is the only braking you have)

[ ] Apply **gentle** counter RUDDER to try to keep it straight. (Axe handles at the end of the wings are for the inevitable ground loop.

Shut down procedure

[ ] Place SCHTOPPBORDEN (20)
[ ] Set SCHNIRPSKNOPF (7) to CUT OFF
[ ] Set SCHPARKMACHER (1) to position 0
[ ] Set FIREWASSERSWITCHEN (3) to OFF (horizontal position)
[ ] Set BENZINEGAMIXER (2) to LEAN (push handle in)

The Spandau LMG 08/15 Machine Guns

The preferred machine gun for the German WW1 war effort was the Spandau MG 08 water-cooled heavy machine gun. Apparently, mounting a 57-pound water-cooled machine gun that took 3 people to operate onto an aircraft with one pilot only seemed liked a bad idea AFTER they tried it on the Fokker Eindecker.   The Spandau LMG 08/15 was quickly developed to be air-cooled and weighed in at 26 pounds and could be toperated by a single pilot. A cocking assist lever was added to the LMG so a pilot could load the gun by themselves (otherwise it took 1 additional person). A safety interlock was also added, presumably so the pilot didn't accidentally shoot the poor propeller starter guy in the head.

The guns fired the 7.92mm x 57 cartridge at around 450 rounds/minute and the ammo cans held 500 rounds for each gun.

The Jemma Studios implementation is as faithful as possible to the 1914 era weapon. Each weapon must be armed, and may be fired, independently. They are air cooled and prone to overheating. Continuous fire will begin to overheat the barrels, and if they get too hot, the gun will fail (and stay that way). If you fire the weapon with the KANONIERGELEVER in the rear position the gun will jam.

Arming procedure

The original MG 08 required one gunner to feed the belt, while another gun operated the bolt. The LMG 08/15 was fitted with a cocking bolt assist lever. It adds to the complexity of arming the weapon as follows:

[ ] Set KANONIERGELEVER (16) to rear position (rests against bolt cam) [Note: Due to camera position, the right KANONIERGELEVER is synced with the left KANONIERGELEVER by default. See below if you want to operate them independently)
[ ] Push left GUNKOCHER (17) forward to feed round into chamber
[ ] Push left GUNKOCHER (17) forward once again to chamber the round
   The weapon is now loaded.

[ ] Repeat the process for the left machine gun.
[ ] Set KANONIERGELEVER (16) to forward position (points toward prop). If you skip this step and fire the weapon, it will jam.
[ ] Push the ZAFETYGELEVER (18) up prior to starting engines.
The weapon will not fire if the prop is not spinning.
TO FIRE:
[ ] Check that the WINDMACHER (19) is spinning
[ ] Pull the ZAFETYZGELEVER (18) down to put the bolt in battery
[ ] Depress the left, right, or both NOISENMACHERS (14) to fire.

[NOTE: If you want the KANONIERGELEVERS to operate independently, edit the `fokker_dr1_config.ini` configuration file in the FokkerDr1 folder and change the `Number_of_assist_levers_to_use_in_the_cockpit` value to 2.]

Clearing Jams

If you leave the KANONIERGELEVER in the rear facing position, and fire the gun, it will jam. The GUNKOCHER gets wedged against the KANONIERGELEVER until cleared.

[ ] Set KANONIERGELEVER (16) to forward position (points toward prop).
[ ] Pull GUNKOCHER (17) back to reset the bolt.
[ ] Push GUNKOCHER (17) forward once again to chamber the round
The weapon is now loaded.
[ ] Set KANONIERGELEVER (16) to forward position (points toward prop). If you skip this step and fire the weapon, it will jam. Again.

Overheating Barrels

DON'T! You have been warned. Mashing down on the NOISENMACHERS will lead to the barrels starting to heat up, if they get yellow hot at the tips, they'll deform and make the weapon useless. This can only be fixed by FIX ALL SYSTEMS on the X-Plane Failures page or reloading the aircraft.

Enjoy!

This is the first full aircraft I have developed and I've learned a lot in its creation. I hope you look forward to my future projects as much as I do.

Thank You!

Thank you to all the alpha & beta testers that provided valuable feedback and other useful information FlyWithNils, SlantAlphaAdventures, pilotmarco, MelvinLeroy, Lee M., Qosmokid

A special thanks to TaLeNT for helping me break the ice with FMOD sounds and for inspiring me to add all the exterior control surface manipulation for immersive VR walk-arounds. (Yeah, I killed the FMOD sounds for now, as the engine sounds I found were not great, plus it's a heck of a lot of work)

Another special thanks to Joe-SimVRlabs for suggestions for VR improvement and for setting up the VR config file.

Thanks goes to F.Justin for pointing out the elevators were animated backwards, though I still wonder why he wasn't concentrating on Alfred's moustache.

Thanks to Edward Frisch for screen sharing his Mac to troubleshoot the SASL plugin issue.

Another HUGE THANK YOU to Lee Morgan and especially F.Justin for discovering the graphic settings issue that caused the darn yoke to not render.

A big thanks to MGouge for his weight and balance suggestions to the flight model

Development To-do

- ~~Develop 3D cockpit~~
- ~~Mappable Schnirpsknopf~~
- ~~Optimize mesh for mid wing and fuselage~~
- ~~Add additional 3D details on exterior (support wires, etc.)~~
- Create additional liveries
- Get Alfred to look where he is going
- ~~Model machine guns~~
- Improve POH (ongoing)
- Develop CSL model
- Develop VATSIM/POSCON version with steam gauges, differential brakes, lights, radios and transponder.
- ~~Remodel rotary engine to look closer to original and also make it spin (including semi-transparent spin disk for >150rpm)~~
- ~~Add oil consumption simulation~~
- ~~Add fuel switch~~
- ~~Add manual magneto (why the hell does this aircraft need a magneto switch and a manual magneto? Nevermind. I'm an idiot)~~
- ~~Install more FMOD sounds (abandoned)~~

Change Log

- Version 0.3d
  - Updated Thank You section
  - AIRCRAFT CHANGES
  - Tweaked aircraft and tank COG for better balance.
  - Top wing hides if torn off in a high G load.
  - Updated SASL library to current version
  - Added scripting for future "replica" model.
- Version 0.3c
  - Updated Thank You section
    AIRCRAFT CHANGES
  - Fixed "require HDR" setting that caused the cockpit yoke to disappear at lower graphics settings.

- o Fixed an issue with the prop/engine running after a reload when all switches were set to cold and dark.
- Version 0.3b
    - o Updated Thank You section
      AIRCRAFT CHANGES
    - o Corrected inverted elevator animation
    - o Corrected script to use correct vulkan/metal testing dataref to avoid plugin failure for Mac Users
    - o Added control cables for elevator and rudder.
- Version 0.3a
    - o Updated to-do list
      AIRCRAFT CHANGES
    - o Added a few additional engine sounds
    - o Added normal map to cockpit gauges
    - o Improved exterior graphics.
    - o Added the 454/17 and 503/17 livery
- Version 0.3
    - o Updated to-do list.
    - o Updated all images to reflect current art.
    - o Updated document and checklists to indicate changes for magneto crank and oil pulsator.
      AIRCRAFT CHANGES
    - o Added magneto and sounds
    - o Added oil pulsator
    - o Rescripted prop so it can be "pulled" at any time, but won't start without mag switch, magneto charge, full rich, and fuel on.
    - o Rescripted prop so it can only be pulled for 1 second at a time.
    - o Added a gun cocking sound.
- Version 0.2a
    - o Removed *NOT RELEASED* from title version number #facepalm
- Version 0.2
    - o Added thanks to Joe @ SimVRlabs
    - o Updated To-Do
    - o Updated button mapping to reflect two sets of machine gun controls
    - o Rewrote the Spandau LMG section to reflect new functionality.
    - o Dropped a hint about Baron Alfred Von Schnauzbart mustache
      AIRCRAFT CHANGES
    - o Removed FMOD sounds
    - o Rewrote machine gun scripts in SASL to be able to add sound files
    - o Rewrote machine gun scripts and added manipulators to operate guns independently
    - o Gun barrels get hot and overheat with continuous gun fire
    - o Gun barrels cool down slowly if firing stops
    - o Guns jam if cocking assist lever is engaged.

- o Detuned elevator response so it's a little less snappy
  - o Tuned elevator AOI so little forward yoke pressure is required to maintain level flight
  - o Wrote a script for Baron Alfred Von Schnauzbart
- Version 0.1d01
  - o HOT FIX: Wrapped brake commands, so wheel boards could not be placed while the aircraft is moving.
- Version 0.1d
  - o Added Thank You section
  - o Added FMOD sounds
  - o Fixed VR axis for fuel mixture lever
  - o Added VR manipulators to check control surfaces while outside of the cockpit
  - o Disabled prop start manipulator from inside the cockpit
  - o Added background images to the manual
  - o Changed exterior front view to add item #18 and added exterior rear view for items #19-21.
  - o Added Pre Start walk around procedure
- Version 0.1c 2020-06-23
  - o Updated Development To-DO
  - o Rewrote/illustrated for new 3D cockpit and weapons.
- Version 0.1b 2020-04-15
  - o Changed all references for YOKE to SCHTICK
  - o Added language regarding schnirpsknopf.lua script.
  - o Updated Development To-Do
- Version 0.1a:
  - o Modified language to indicate Schnirpsknopf is now a correctly modeled momentary switch.